SECTION 16631 - EMISSIONS MONITORING SYSTEM

PART 1 - GENERAL

SUMMARY:

Section Includes, but is not limited to:

Install and test emissions monitoring equipment as shown on the drawings and specified herein. Items identified as GFE on the drawings and/or listed in Appendix A, Schedule X will be furnished by the Contractor. All other parts and equipment shall be furnished by the Subcontractor to ensure the complete installation of the system.

Work scope includes, but is not limited to:

1. Install GFE emissions monitoring cabinet as shown on the drawings.
2. Provide power to the emissions monitoring cabinet as shown on the drawings, using the circuits indicated.
3. Install wiring for signaling between the emissions monitoring cabinet and the monitoring and control cabinet as shown on the drawings.
4. Install sample lines, conduit and pressure lines from the stack interface to the emissions monitoring cabinet as shown on the drawings and as directed by the supplier of the emissions monitoring equipment.
5. Insulate and heat trace the sample lines as directed by the provider of the emissions monitoring equipment.
6. Support testing of the emissions monitoring system as indicated in the testing section below.
7. Work with emissions monitoring equipment supplier's representative to ensure correct installation of the system.

RELATED SECTIONS:

16000	ELECTRICAL GENERAL PROVISIONS
16110	ELECTRICAL RACEWAYS
16120	CABLE, WIRE, CONNECTORS AND OTHER MISCELLANEOUS DEVICES
16195	ELECTRICAL IDENTIFICATION FOR LABELING REQUIREMENTS
16450	GROUNDING

REFERENCES:

The following documents including others referenced therein, form part of this Section to the extent designated herein:

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	OSHA Electrical Safety

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	Standard for Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	National Electrical Code (NEC)

UNDERWRITERS' LABORATORIES, INC. (UL)

UL 515	Electric Resistance Heat Tracing for Commercial and Industrial Applications

SUBMITTALS:

Submittals include, but are not limited to:

Product Data: The Subcontractor shall submit catalog cut sheet which show as a minimum the complete operating specification of all items to be purchased under the requirement and all instruments which will be used in the installation and testing of the emissions monitoring system.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Codes and Standards: Comply with the provisions of the following codes and standards unless otherwise specified herein.

All labor, materials and equipment used, and workmanship shall conform to the applicable chapters of the National Electrical Code NFPA 70 and the Occupational Safety and Health

Administration (OSHA). All modifications required by these codes, rules, regulations, and authorities shall be made by the Installer without additional charge to the Contractor

Underwriters Laboratories (UL): All installation materials, appliances, equipment or devices shall conform to the applicable standards of Underwriters Laboratories, Inc. All material, appliances, equipment or devices shall be listed and/or labeled by UL.
Completed instrumentation and control system shall conform with applicable provisions of the Special Conditions, the Technical Specification, and the subcontract drawings.

PART 2 - PRODUCTS

GENERAL:

Furnish all materials, equipment and components required to complete the installation of the complete emissions monitoring system.

SAMPLE LINES:

Swagelok® R (Crawford) compression fittings shall be used for joints and interfaces in sample line tubing.

Pipe insulation and other similar materials containing asbestos shall not be used. Pipe insulation shall be compatible with the piping material.

LABELING:

Install permanent labels on all electrical panels, cabinets, major equipment or components. See Section 16195 or 16196--Electrical Identification.

MATERIALS:

Condition of products: Except as otherwise indicated, provide new electrical products, free of defects and harmful deterioration at the time of installation. Provide accessories and assembly devices recognized as integral parts of the product or required by governing regulations.

Unless otherwise indicated by the drawings or specifications or approved in writing, the materials and/or equipment furnished under this specification shall be the standard product of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's standard design.

Uniformity: Where multiple units of a product are required for the electrical work, provide identical products by the same manufacturer without variations except for sizes and similar variations as indicated.

PART 3 - EXECUTION

INSTALLATION:

General: It is recognized that the installation documents are diagrammatic in showing certain physical relationships which must be established within the instrumentation and control work and in its interface with other work, including electrical, utilities and mechanical work, and that such establishment is the responsibility of the Installer.
Arrange all work in a neat, well organized manner with cable, conduit, tubing and similar services running parallel with the primary lines of the building construction, and with a minimum of 7 ft-0 in. overhead clearance.

Locate operating and control equipment properly to provide easy access, and working clearance in accordance with the NEC.

Advise other trades of openings or clearances required in their work for the subsequent move-in and assembly of large units of equipment.

INSTALLATION REQUIREMENTS:

Install the radiation monitoring equipment per the manufacturers' drawings and specifications.

Signal cabling and wiring of the radiation monitoring equipment shall be performed per the drawings.

FIELD QUALITY CONTROL:

Subcontractor Supplied Testing: The Subcontractor shall be responsible for testing sample and instrument lines to ensure that there are no leaks or blockages in the tubing. The Subcontractor shall be responsible for submitting a test procedure prior to the test and shall correct any problems related to the above without additional cost to the Contractor.

The subcontractor shall retain the services of the supplier of the emissions monitoring equipment (Air Monitor Corporation) to provide system testing. System testing shall include the following :

1. Velocity profile test
2. Functional test of flow control system

3. Functional test of alarm and monitoring parameters wited into WES-CP-800
4. Functional test of the heat trace system
5. Functional test of temperature and flow sensors

Testing of all devices shall be done in the presence of the Contractor's representative. Subcontractor shall coordinate testing with the system provider and schedule testing a minimum of 4 days in advance of the test. Test procedures must be written and submitted to the Contractor for approval prior to testing.

Contractor Inspection and Testing: Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 16631

SECTION 16632 - CRITICALITY ALARM SYSTEM

PART 1 - GENERAL

SUMMARY:

Section Includes, but is not limited to:

Install and test criticality alarm system as shown on the drawings and specified herein. Items identified as GFE on the drawings and/or listed in Appendix A, Schedule X will be furnished by the Contractor. All other parts and equipment shall be furnished by the Subcontractor to ensure the complete installation of the system.

Work scope includes, but is not limited to:

1. Fabricate support stands and brackets for the criticality alarm system and alarm modules.
2. Install the GFE criticality alarm system.
3. Furnish and install the control enclosure for the criticality alarm system.
4. Install the necessary visual and audible alarms.
5. Provide power to the criticality alarm system using the circuits indicated.
6. Install wiring for signaling between the criticality alarm system and the remote alarming and reset stations.
7. Support testing of the criticality alarm system as indicated in the testing section below.

Please refer to the Subcontractor drawings for additional details regarding the above work scope.

RELATED SECTIONS:

16000	ELECTRICAL GENERAL PROVISIONS
16110	ELECTRICAL RACEWAYS
16120	CABLE, WIRE, CONNECTORS AND OTHER MISCELLANEOUS DEVICES
16195	ELECTRICAL IDENTIFICATION FOR LABELING REQUIREMENTS
16450	GROUNDING

REFERENCES:

The following documents including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN NATIONAL STANDARDS INSTITUTE

ANS/ANSI 8.3	Criticality Accident Alarm Systems

CODE OF FEDERAL REGULATIONS (CFR)

9 CFR 1910	OSHA Electrical Safety

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	Standard for Enclosures for Electrical Equipment (1000 Volts Maximum)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	National Electrical Code (NEC)

UNDERWRITERS' LABORATORIES, INC. (UL)

SUBMITTALS:

Submittals include, but are not limited to:

Product Data: The Subcontractor shall submit catalog cut sheet which show as a minimum the complete operating specification of all items to be purchased under the requirement and all instruments which will be used in the installation and testing of the emissions monitoring system.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Codes and Standards: Comply with the provisions of the following codes and standards unless otherwise specified herein.

All labor, materials and equipment used, and workmanship shall conform to the applicable chapters of the National Electrical Code NFPA 70 and the Occupational Safety and Health Administration (OSHA). All modifications required by these codes, rules, regulations, and authorities shall be made by the Installer without additional charge to the Contractor

Underwriters Laboratories (UL): All installation materials, appliances, equipment or devices shall conform to the applicable standards of Underwriters Laboratories, Inc. All material, appliances, equipment or devices shall be listed and/or labeled by UL.
Completed instrumentation and control system shall conform with applicable provisions of the Special Conditions, the Technical Specification, and the subcontract drawings.

In addition to the above requirements, this system has been designated Safety Significant. Please refer to Section 1005, page 3 for further requirements.

PART 2 - PRODUCTS

GENERAL:

Furnish all labor, materials, equipment and components required to complete the installation of the complete emissions monitoring system.

LABELING:

Install permanent labels on all electrical panels, cabinets, major equipment or components. See Section 16195 or 16196--Electrical Identification.

MATERIALS:

Condition of products: Except as otherwise indicated, provide new electrical products, free of defects and harmful deterioration at the time of installation. Provide accessories and assembly devices recognized as integral parts of the product or required by governing regulations.

Unless otherwise indicated by the drawings or specifications or approved in writing, the materials and/or equipment furnished under this specification shall be the standard product of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's standard design.

Uniformity: Where multiple units of a product are required for the electrical work, provide identical products by the same manufacturer without variations except for sizes and similar variations as indicated.

PART 3 - EXECUTION

INSTALLATION:

General: It is recognized that the installation documents are diagrammatic in showing certain physical relationships which must be established within the instrumentation and control work and in its interface with other work, including electrical, utilities and mechanical work, and that such establishment is the responsibility of the Installer.

Arrange all work in a neat, well organized manner with cable, conduit, tubing and similar services running parallel with the primary lines of the building construction, and with a minimum of 7 ft-0 in. overhead clearance.

Locate operating and control equipment properly to provide easy access, and working clearance in accordance with the NEC.

Advise other trades of openings or clearances required in their work for the subsequent move-in and assembly of large units of electrical equipment.

INSTALLATION REQUIREMENTS:

Install the radiation monitoring equipment per the manufacturers' drawings and specifications.

Installation of signal cabling and wiring for the radiation monitoring equipment shall be performed per the drawings. .

FIELD QUALITY CONTROL:

Subcontractor Supplied Testing: Upon completing installation of all systems and equipment, but prior to project close out, the Installer shall conduct an operational test of all equipment, controls and devices installed or modified by the Installer. In certain instances, testing and acceptance criteria will be conducted/directed by the Contractor.

Tests shall include, as a minimum:

1. Provide power to Critical Alarm System (CAS); have Contractor's representative verify proper operation of criticality alarm system.
2. Have Contractor's representative simulate a CAS alarm. Verify that all audible and visual alarms are working properly. Measure volume of audible alarms to ensure that the sound pressure of alarm signals is 10dBA or more above ambient (as defined by

industrial safety) but no less than 75 dBA or greater than 115 dBA in any area that will be occupied by personnel.

Tests procedures shall be provided to the Installer by the Operating Contractor, unless otherwise required as submitted vendor data. Testing of all devices shall be done in the presence of the Construction Manager (CM). Installer shall coordinate testing with the CM and schedule testing a minimum of 4 days in advance of the test. This operational testing is in addition to testing required in separate sections of this specification.

Contractor Inspection and Testing: Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 16632

SECTION 16650 - LIGHTNING PROTECTION

PART 1 - GENERAL

SUMMARY:

Subcontractor shall provide and install lightning protection equipment of types, grades, and sizes as shown on the drawings and as specified in this specification.

Section Includes, but is not limited to:

Furnish all materials and complete assembly including, but not necessarily limited to air terminals, rods, bases, cables, connectors, and to other components and accessories as needed for a complete system.

REFERENCES:

See the list of general references in Section 16000.

SUBMITTALS:

Catalog Data

See Section 01300, Submittals and the Vendor Data Schedule for submittal requirements.

QUALITY CONTROL:

Codes and Standards: Lightning Protection System shall comply with NFPA 780 and NFPA 70 (NEC). All equipment shall comply with UL Standards 96 and 96A.

PART 2 - PRODUCTS

MATERIALS:

Secondary or bonding conductor cable shall be minimum of 14 strands No. 17 AWG smooth twist copper wire braided together, 90 lb minimum pr 1000 ft, located as shown on the drawings. VFC No. 14, Thompson No. 14.

Ground grid and ground terminal connection shall be made by the thermit weld process, Cad Weld.

Air terminals shall be 24 in. long, 5/8 in. diameter, nickel tipped, tubular copper. VFC No. 104, Thompson No. 571.

Roof air terminal bases shall be provided as necessary to install the air terminals on the trusses supplied.

Cable holders shall be stamped copper no-nail for flat surfaces VFC No. 261, Thompson No. 690. Install at spacing intervals maximum 3 ft of cable run.

Splicer clamps shall be two bolt cast bronze pressure type clamp. Subcontractor shall bond or splice main to secondary runs. Proper size and type of splicer shall be furnished and installed at all junctions or bond points, sized as per manufacturer for cable furnished.

Bonding lugs for metal objects shall be heavy duty bonding lugs bolted to metal surface. Lug shall have minimum 3-1/2 $in.^2$ bonding surface and bolted pressure type connector, cast bronze body. VFC No. 222, Thompson No. 702.

Subcontractor shall furnish all miscellaneous bolts, clamps, anchors, and materials to bond all points as shown on drawings and required by NFPA 78.

NOTE: Equipment specified is VFC Inc., one other approved manufacturer is Thompson Lightning Inc.

PART 3 - EXECUTION

INSTALLATION:

Furnish and install a complete lightning protection system as indicated on the drawings and this specification in accordance with applicable requirements of NFPA 780 complying with recognized industry practices to ensure that products serve intended functions and comply with requirements.

All exposed noncurrent-carrying metallic parts of raceway systems, building steel, grounding conductor, and bare cables of the wiring system shall be grounded.

CORROSION PROTECTION:

Use no combination of materials that may form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture, unless moisture is permanently excluded from the junction of such metals. Where unusual conditions exist that would cause deterioration or corrosion of conductors, use conductors with suitable protective coatings.

Exothermic Welds: Exothermic welds shall be made and tested in accordance with the manufacturer's written recommendations. No mechanical connector is required at exothermic weldments.

FIELD QUALITY CONTROL:

Subcontractor Supplied Testing: Visual inspection to determine that Lightning Protection System installation conforms to NFPA 780, LPI 177 these specifications and the drawings. Document the inspection on LPI Form LPI-1-R91.

Contractor Inspection and Testing: Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 16650

SECTION 16721 - FIRE ALARM (FA) SYSTEM

PART 1 - GENERAL

SUMMARY

This is a project to install fire alarm system initiation devices, fire sprinkler system monitoring, and occupant notification devices in buildings RWMC 671 and the temporary fire riser building. The devices are to be connected to the fire alarm control panel located in RWMC 671(WES) Building. The fire alarm system will transmit all fire alarms, supervisory, and trouble signals to the INEEL central fire alarm monitoring system via DACT.

Section Includes: but is not limited to:

1. Configure the initiation devices (including manual fire alarm stations, sprinkler waterflow, fire extinguishing systems) on a Signaling Line Circuit so that they comply with NFPA 72 Table 3-6 requirements for Class B, Style 4, circuits.
2. Configure the occupant notification devices on Notification Appliance Circuits so that they comply with NFPA 72 Table 3-7 requirements for Class B, style Y, circuits. The audible devices shall be electronic horns and the visual devices shall be ADA strobes.
3. Install wire and conduit to connect the devices using a minimum ¾" conduit and #18 wire for signaling line circuits, # 14 wire for Occupant notification devices, #12 wire for 120-vac power, and # 14 wire for 24-vdc power.
4. Furnish and install the initiation devices and occupant notification devices shown on the drawings and as listed in this specification.
5. Provide and install Occupant Notification devices for level 1 (50PPM), level 2 (100PPM), and general alarm for level 3 (200PPM).
6. Complete an acceptance test procedure that confirms that all equipment is operational and installed in accordance with the plans, specifications, and manufacturers listing.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 13	Installation of Sprinkler Systems
NFPA 750	Installation of Water Mist Systems
NFPA 70	National Electrical Code
NFPA 72	National Fire Alarm Code

UNDERWRITERS LABORATORIES (UL)

Fire Protection Equipment Directory
Electrical Construction Materials Directory
Building Materials Directory

FACTORY MUTUAL ENGINEERING CORPORATION (FM)

FM Approval Guide

DEPARTMENT OF ENERGY

DOE-ID Architectural Engineering Standards Section 1385

SUBMITTALS:

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

Submittals include, but are not limited to:

1. Working drawings
2. Equipment catalogue
3. "As Built" drawings
4. The completed "Record of Completion" form as required by NFPA 72
5. Owner's manual
6. Wire and cable tests including opens, shorts, and impedance
7. Battery backup design calculations
8. Notification appliance design calculations
9. The completed "Inspection and Testing" form as required by NFPA 72
10. A copy of the designer's certification

DESIGN:

The fire alarm system shall be submitted as a complete package for review. Partial submittals will be considered as incomplete and will not be reviewed. The Contractor prior to beginning installation must approve the final design.

Procedures: The Subcontractor shall submit a test procedure that will be used to verify proper operation of all new fire alarm equipment.

Test Reports: Completed test document shall be submitted by the Subcontractor to the Contractor's Representative after the testing is completed.

QUALITY CONTROL:

Qualifications: The Equipment supplier for the Subcontractor of the fire alarm system shall have a National Institute Certified Engineering Technician, (NICET), Level III rating in Fire Alarms and be responsible for overseeing the preparation of the layout drawings. This person shall be required to certify that the drawings are in accordance with this specification and all referenced regulatory requirements and that the system is installed in accordance with the drawings and specifications.

Experience: The Subcontractor shall have a minimum of three (3) years' experience in the installation of the Fire Alarm Systems.

Training: None required for this project.

PART 2--PRODUCTS

MATERIALS:

All materials, appliances, equipment or devices shall be new, UL listed and/or FM approved for use in the intended application. All individual components and composite systems shall be designed for continuous operation without undue heating or change in rated values.

Circuit Breakers: Circuit breakers protecting fire alarm equipment shall be marked with red engraved phenolic resin tags with white lettering stating "FIRE ALARM EQUIPMENT." The circuit number and electrical distribution panel shall be labeled at the fire alarm control panel.

Batteries: All batteries shall be sealed lead acid type batteries.

Devices: Provide all devices required for a working system. Provide all new equipment including but not limited to terminal boxes, transient eliminators, terminal strips, terminal lugs, conduit and wire.

1. Manual fire alarm stations: Manual fire alarm stations shall be UL 38 listed, double action type, with single pole single throw contacts. "Break Glass" types are not acceptable. Each device shall be addressable Siemens Model MSI-20B.
2. Sprinkler waterflow switches: Potter Model VSR-F or Potter Model PS10A or Potter VSR-SF.
3. Sprinkler valve tamper switches: Potter Model PMS or PTS-B or as supplied by the valve manufacturer.
4. Low Air Pressure Supervisory Switch: Potter PS40A
5. Low Air Temperature Switch: Potter Model RTS-O
6. Digital Alarm Communications Transmitter (DACT): Radionics Model D2071A

Conduit: All wiring shall be in conduit. Conduit for the fire alarm system shall be dedicated for fire alarm circuits. The minimum size shall be ½" diameter. See Section 16110 of this specification for conduit requirements.

Wire: Wire shall not be spliced except on a terminal strip and shall be continuous up to termination points. New fire alarm wire shall be in pairs, 18,16, 14, 12 AWG, stranded with seven strands per conductor or solid, 600 volt.

Wire Labels: Brady type B-322, Self-Extinguishing Heat-Shrink Polyolefin or approved equal.

Spade Terminal Lugs: Spade lugs shall be used on all terminals when compatible. AMP studs size 6, for wire size 16 AWG or approved equal. Connecting un-lugged wires to terminals designed for lugs is prohibited.

Terminal Strip: Terminal strips shall be compatible with spade terminal lugs. Any wiring not using lugs shall be tinned with solder prior to connecting to equipment. Terminal strips shall be rated 600 volts minimum, 15 Amps minimum. All terminal strips shall have barriers between terminals.

Pressure Type Terminal Connections: Any wiring terminated to pressure type terminal connectors shall be tinned with solder prior to connection to equipment.

Occupant Notification Device(s): The notification appliances shall be Wheelock Series AS Audible Strobe appliances and Series AH Audible appliances. The Series AS Audible strobe shall be listed for UL standard 1971 for indoor service. The AH Audible shall be UL listed standard 464. All inputs shall be compatible with standard pole reversal supervision of circuit wiring by the FACP.

The audible portion shall have a minimum of three field adjustable settings for dBA levels and shall have a choice of continuous or temporal (Code 3) audible outputs.

The visual strobe portion shall have a minimum of four field selectable settings and shall be UL Listed for 15, 30, 75 or 110 candela.

CO Monitoring System, Level 1 notification: The notification device shall be a Siemens, Model U-EC-M-MCS, set for chime sound.

CO Monitoring System, Level 2 notification: The notification device shall be a System Sensor, Model SS24LOA, set for Slow Whoop sound.

Monitor Module(s): The system monitor module(s) shall be UL 864 listed, provide class B, style B, fire alarm signals from non-addressable devices such as sprinkler waterflow alarm,

water mist alarm, CO Monitoring system alarm, and valve tamper switch and fire pump control panel supervisory signals. The monitor modules shall be Siemens Model TRI-S or TRI-D.

Fire Alarm Control Panel: The fire alarm control panel shall be UL 864 listed, modular in design, of the addressable type. The fire alarm control panel shall be a Siemens MXL-IQ with SMB-2 motherboard.

PART 3--EXECUTION

INSTALLATION:

Audible/Visual devices shall be mounted in accordance with NPFA 72 Chapter 4. They shall be mounted at 96 inches (centerline) above the finished and 6 inches below the ceiling or on the ceiling.

Fire alarm control panel and terminal boxes shall be mounted 5 feet 6 inches above finished floor to top of enclosure.

Manual fire alarm pull boxes shall be mounted not less than 42 inches to the centerline above the finished floor.

Notification: The fire alarm Subcontractor shall notify the Contractor in writing two weeks prior to beginning work. The Subcontractor shall not connect into or modify any part of the existing fire alarm system unless authorized by the Operating Contractor's Representative.

Final Connection To The INEEL Proprietary System: The Contractor shall make all of the final connections to the existing INEEL Proprietary Supervisory System

Software Programming: The Subcontractor shall complete the final software programming using the INEEL licensed Siemens software.

WORKMANSHIP:

All work shall be done in a skillful and workmanlike manner. The Subcontractor shall do all construction work associated with the installation of conduit, wire, and equipment. No modifications or rearrangements, not shown on the drawings, shall be made without prior approval from the Contractor. After the equipment is installed, all wiring in enclosures shall be neatly secured in place by cable ties. Conductors in cabinets shall be carefully formed and harnessed.

Terminal lugs shall be crimped to conductors with a calibrated crimping tool. The crimping tool shall be compatible with lugs being crimped.

WIRE LABELING:

Conductors shall be labeled at each termination point for all circuits with heat shrink labels giving destination location. All wire labels shall be pre-typed; heat shrink labels and shall be heated for uniform shrinkage. Wire labels shall be installed such that the typed information is readily identifiable. To identify each type of device, an abbreviated ID has been assigned for wire label purposes (see drawings for wire termination connections and abbreviation). The abbreviations shall be used for wire labels. The following list does not intend to be all-inclusive but shall be used as a standard for abbreviated labels.

JB-1646-01-01-03	Junction terminal box - building 1646 - terminal box 1 terminal strip 1 - terminal point 3.
MFA -	Manual Fire Alarm
WFA-	Waterflow Alarm
TS-	Tamper Switch
LAT-	Low Air Temperature
LAP-	Low Air Pressure
FPR-	Fire Pump Running
CO-	Carbon Monoxide
WMA-	Water Mist Alarm
MM-	Monitor Module
A/V-	Occupant Notification Device.
FACP-BA-01-02 -	Fire alarm control panel, row B, column A, terminal strip 1, terminal point 2.

Labeling Cable or Cable Bundles Between Enclosures: Cables or cable bundles from one enclosure to another enclosure shall be labeled.

Labeling shall include an abbreviated destination address identifying the terminal box or fire alarm panel and building number. The label shall also include the words "POWER LIMITED FIRE ALARM". Cables sharing the same raceway with the same destination may use a single cable label if cables are dressed and harnessed separate from other cables in the same enclosure.

The following is a list of abbreviations for enclosures and shall be used as standard when applicable.

JT	Junction Terminal Box
LP	Lighting Panel
TB	Terminal Box

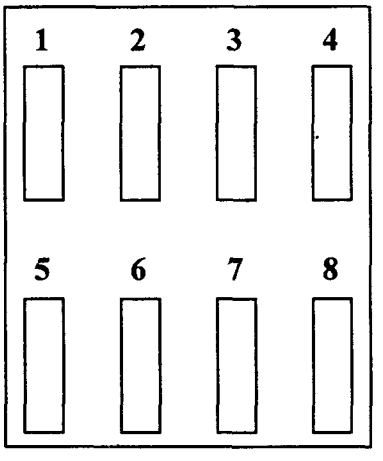
EQUIPMENT LABELING:

All terminal box numbers, panel numbers, and alarm device event numbers shall be labeled. Labels shall be made upon red engraved laminated phenolic resin nameplates with white lettering. Lettering for event numbers shall be one half inch high. Lettering for terminal boxes and panels shall be 1 in. high. Labels for equipment shall be permanently installed.

Labeling Modules Within An Enclosure: Modules shall be laid out in rows and columns for identification purposes. Modules shall be identified using a permanent marker identifying their row and column location within an enclosure. The following is an example of how rows and columns should be laid out using a 6-row 4-column array.

AA	AB	AC	AD
BA	BB	BC	BD
CA	CB	CC	CD
DA	DB	DC	DD
EA	EB	EC	ED
FA	FB	FC	FD

The following is a standard of how a terminal strip would be laid out with two rows and four columns.



Label List: The Subcontractor shall provide a list of labels associated with each fire alarm panel for approval prior to installation. The list shall include labels for fire alarm panels, terminal boxes, and alarm devices. The label lists shall be submitted for review and approval prior to installation specifying where they will be used.

FIELD QUALITY CONTROL:

Subcontractor Supplied Testing: Upon completion of the fire alarm system installation, the individual with the NICET level III certification shall conduct the final testing of the installation. The purpose is to verify that the installation has been installed in accordance with the drawings and this specification.

Acceptance test procedure: The acceptance test procedure shall comply with NFPA 72 paragraph 7-1.6.2. The results of this inspection and testing shall be recorded on form similar to NFPA Figure 7-2.2.2 Inspection and Testing Form. The Subcontractor shall conduct the acceptance using an approved acceptance test procedure document.

The acceptance test will verify that all equipment has been installed properly and is operable before connecting it to the existing fire alarm systems. Adjustments and settings to achieve correct operation will be made as necessary during the acceptance test. Completed acceptance test document shall be submitted to the Contractor's Representative after the test.

All Subcontractor supplied equipment shall test satisfactory or be repaired or replaced at no additional cost to the Contractor

Resistance Measurements: Resistance measurements shall be made with an analog meter with input impedance of 20K ohm per volt or greater. A digital meter shall not be used to make resistance measurements. Measurements shall be read with the meter on the most appropriate scale so that needle deflection is as close to mid scale as possible.

Megger Testing: Prior to terminating, test cables or wire of 25 ft or longer for insulation resistance with a megger (500 V megger for 300 V insulation). Any conductor with less than 10 megohms to ground shall be replaced before proceeding with the terminating. List the conductors tested on a test data submittal sheet. Note: No meggering test shall be performed with wiring connected to transient eliminators, modules or panels.

Capacitance Testing: Prior to terminating to a "smart panel", test cable or wire of 25 ft or longer for capacitance as required by the manufacture. Capacitance measurements shall be made with a capacitance bridge or other suitable capacitance-measuring device. The measurements shall show both the upper and lower power points.

Impedance Testing: Impedance measurements shall be made with an impedance bridge of other suitable impedance device. The measurements shall show both the upper and lower half power points.

CONTRACTOR SUPPLIED SURVEILLANCE:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications. The Contractor's Representative shall be present during system testing and at the time that final connections to existing systems are made

END OF SECTION 16721

SECTION 16730 - CARBON MONOXIDE (CO) DETECTION SYSTEM

PART 1--GENERAL

SUMMARY:

This specification describes the work required to provide a carbon monoxide detection system that is used for detection of carbon monoxide gas.

Section Includes, but it not limited to:

Furnish, install, fabricate, and test a complete Carbon Monoxide Detection system. This includes providing all of the equipment necessary to have a complete and functional system including a battery backed power supply so that the system will operate for at least 24 hours in the event of a power failure.

SUBMITTALS:

Submittals include, but are not limited to the following:

1. Record drawings
2. Manufacturer's specification
3. Equipment list
4. Wire label list
5. Owners manual
6. Wire and cable tests including opens and shorts.
7. Battery backup design calculations
8. A copy of the installer's factory certification and experience

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	National Electrical Code

DESIGN REQUIREMENTS:

The Carbon Monoxide detection system described herein shall provide the capability of detecting Carbon Monoxide gas at a level of 25 ppm to 500 ppm at a distance of 24 inches above the floor at two locations inside the RCS.

Design: The system design shall be submitted as a complete package for review. Partial submittals will be considered as incomplete and will not be reviewed. The Contractor must approve the design before beginning installation.

Procedures: An acceptance test procedure shall be submitted by the Subcontractor and approved prior to testing.

Test Reports: Completed acceptance test documents shall be submitted to the Contractor's Representative after the test.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Qualifications: The design shall be by a person with a minimum of a factory certification.

Codes and Standards: Comply with requirements of the current revision of the following codes and standard, as specified in these specifications:

NFPA 70

PART 2 - PRODUCTS:

Material: All equipment shall be new including but not limited to junction boxes, conduit, and wire.

Approval: All CO detection systems materials, components, and assemblies shall be approved for CO detection. All individual components and composite systems shall be designed for continuous operation without undue heating or change in rated values.

Circuit Breakers: Circuit breakers protecting CO detection equipment shall be marked with black engraved phenolic resin tags with white lettering stating CO DETECTION EQUIPMENT.

Control Panel: The CO control panel shall be a Thermo Gas Tech, Part Number, 72-0024-01, Model 128 controller w/t IS barrier.

Battery Backup Power Supply: The Backup power supply shall be a Thermo Gas Tech Part Number 49-8105 with 24-vdc batteries rated at 7 ah.

Calibration Kit: The calibration Kit shall be a Thermo Gas Tech, Model 81-0269-02.

Batteries: All batteries shall be sealed, lead acid batteries, 7 ah.

CO Detection Devices: Provide two Thermo Gas Tech, Model 67-0028-03, model 128 transmitter for CO @ 0 to 500 ppm, detection devices and locate them as shown on the drawings.

Conduit: All wiring shall be in conduit. Conduit for the system shall be dedicated for the system circuits. See Section 16110 of this specification for conduit requirements.

Cable and Wire: Wire/cable shall not be spliced except on a terminal strip and shall be continuous up to termination points. The cable shall be four wire plus shield, Beldon 82418 cable. The cable shall be power limited as described in NEC.

Occupant Notification Devices: See Specification 16721 for Level 1, 2 and 3 signals.

Wire Labels: Brady types B-322, Self-Extinguishing Heat-Shrink Polyolefin.

Pressure Type Terminal Connections: Any wiring terminated to pressure type terminal connectors shall be tinned with solder prior to connection to equipment.

PART 3--EXECUTION

INSTALLATION:

Install all CO detection systems equipment, components, and materials, including conduit and wire, to provide a complete and workable system.

Conduit: Conduit for the system shall be dedicated for CO detection system circuits. All wiring shall be in conduit.

LABELING:

Tags: Refer to Section 16195-Electrical Identification. Tags shall be made up on engraved laminated phenolic resin nameplates (color black) with white lettering. Unit tags shall be made with one half-inch high lettering. A tag shall be permanently attached at each device. The tag shall contain the information given in the notification appliance device table.

Labeling Twisted Shielded Cable: TSP cable(s) shall be labeled at each termination point with typed heat shrink labels. Heat shrink labels shall be heat shrunk for uniform shrinkage.

Labels shall state the circuit type (CO detection circuit COMS).

FIELD QUALITY CONTROL:

Subcontractor Supplied Testing: The Subcontractor shall test the complete system to insure that the system performs the required functions. As a minimum, the tests shall include the manufacturer's start up procedures, and acceptance procedures.

Contractor Supplied Surveillance: Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications. Inspection of equipment, installation, and witnessing of all tests shall be accomplished by the Contractor's Representative.

END OF SECTION 16730

SECTION 16810 - INSTRUMENTATION GENERAL PROVISIONS

PART 1 – GENERAL

SUMMARY:

WORK DESCRIPTION:

The Subcontractor shall furnish all supervision, labor, material, equipment, and supplies (except Government-furnished materials and/or equipment) and perform all work in accordance with the subcontract drawings and these specifications. Unless otherwise specified, references in these specifications or on the subcontract drawings to other specifications, codes standards or manuals, which are a part of these specifications, but not included herein shall be the latest edition of these publications, including any amendments and revisions in effect as of the date of this Specification. In general all work shall be in compliance with applicable sections of 29 CFR 1910 General Industry Safety Standards, 29 CFR 1926 Construction Industry Safety Standards.

This section applies primarily to those drawing with a Sheet Number beginning with IN (e.g., IN-1, IN-2, etc. Other related information is conveyed in the E drawings.

WORK INCLUDED:

Work in and around the WES structure and includes, but is not limited to:

1. Installing a programmable logic controller, human machine interface (HMI), new controls, relays, cables, and wiring.
2. Installing panel enclosures.
3. Installing emergency stop stations with associated annunciators
4. Installing a variable frequency drive.
5. Installing pressure, flow, and temperature transmitters.
6. Installing alarm lights on the outside of the structure.

QUALITY CONTROL:

Codes and Standards: National Electrical Code (NFPA 70): Work and materials shall conform to the related sections of the National Electrical Code

Underwriters' Laboratories (UL): All materials, appliances, equipment or devices shall conform to the applicable standards of Underwriters' Laboratories, Inc. All material, appliances, equipment or devices as far as possible shall be listed and/or labeled by UL.

Field Quality Control: A Quality Assurance program shall exist to ensure that all work performed is in conformance with the requirements established by the drawings and this specification. The Contractor's Representative shall witness all testing as noted throughout these specifications.

SUBMITTALS:

Shop Drawings and Vendor Data: Copies of shop drawings and/or vendor data for materials and equipment to be furnished by the Subcontractor shall be submitted by the Subcontractor for the Contractor's review if different from items specified on the drawings. The Subcontractor shall also turn over any documentation packaged with government furnished items. The data submitted shall be in such detail as to clearly illustrate the materials and equipment, including components and the fabrication thereof, that the Subcontractor proposes to furnish. If the submitted items change electrical termination points as shown on the design drawings the Subcontractor shall also submit red line drawings. These red-line drawings shall show the changes and shall be approved before the item is installed. For example suppose a relay is submitted for approval with coil termination points 2 and 7 and on the design drawings the coil termination points are shown as N and K. For this case in addition to the above requirements the Subcontractor will also submit a red line mark up of the affected design drawing showing the terminals changing from N and K to 2 and 7. The drawings and changes shall be made at no cost to the Contractor.

Hazardous Chemicals and Substances: Material Safety Data Sheets as required by 29 CFR 1926.59, Hazard Communication Standard, shall be submitted for approval before use of the hazardous substance.

PART 2 - PRODUCTS

GENERAL:

Furnish all labor, materials equipment and appliances (except government furnished equipment), required to complete the installation of the complete instrumentation systems. All labor, materials, service, equipment, and workmanship shall conform to the applicable chapters of the National Electrical Code NFPA 70, Occupational Safety and Health Administration (OSHA). All modifications required by these codes, rules, regulations, and authorities shall be made by the Subcontractor without additional charge to the Contractor.

All materials, equipment and installations shall be accessible for inspection by the Contractor or his designated representative during any phase of construction, fabrication, manufacture and erection or testing.

GOVERNMENT FURNISHED MATERIAL (GFE):

The Subcontractor shall provide all material other than the items shown on Schedule X. The government furnished material shall be obtained prior to the start of any installation work and stored in the area designated by the contractor along with new material provided by the Subcontractor. At completion of the job, any unused government furnished material shall be returned to the Contractor.

CONDITION OF PRODUCTS:

Provide new products, free of defects and harmful deterioration at the time of installation. Provide each product complete with trim, accessories, finish, guards, safety devices and similar components specified or recognized as integral parts of the product, or required by governing regulations.

Unless otherwise indicated by the drawings or specifications or approved in writing, the materials and/or equipment furnished under these specifications shall be the standard products of manufacturers regularly engaged in the production of such equipment, and shall be the manufacturer's standard design.

Damaged Materials: All materials and equipment received by the Subcontractor in a damaged condition, shall be repaired or replaced by the Subcontractor as directed by the Contractor. Materials and equipment damaged by the Subcontractor shall be repaired or replaced by the Subcontractor at Subcontractor expense.

Uniformity: Where two or more units of the same type and class of material or equipment are required, the units shall be the product of the same manufacturer, and shall be identical insofar as possible. The component parts of a unit of equipment need not be the products of the same manufacturer.

PART 3 - EXECUTION

Repair of Damages: Construction materials and equipment, threads, machined or painted, and other exposed finished surfaces shall be protected from damage at all times during shipping, handling, construction and installation. Materials and equipment repaired or replaced by the Subcontractor shall be subject to acceptance by the Contractor or the Contractor's Representative.

Existing Materials, Equipment and Structures: Existing materials, equipment and structures, including paint and protective coatings, involved under this Subcontract shall be thoroughly inspected by the Subcontractor before starting any work. Any defects or damages, the repair of which are not covered under these specifications or subcontract drawings, shall be reported

in writing to the Contractor by the Subcontractor. The Subcontractor shall place reinstalled operating equipment in an operating condition that is at least as good as it was at the time the Subcontractor started work.

COORDINATION OF INSTRUMENTATION WORK:

General Requirements: Materials and equipment shall be erected or installed only by qualified personnel who are regularly engaged in the trades required to complete the work. The subcontract drawings show the general arrangement and space allocation of the equipment specified. It shall be the Subcontractor's responsibility to verify changes in conditions or rearrangements necessary because of substitutions for specified materials or equipment. Where rearrangements are necessary the Subcontractor shall, before construction or installation, prepare and submit drawings of the proposed rearrangement for approval. The drawings and changes shall be made at no cost to the Contractor.

Coordination of Work: Where new work and existing facilities are shown on the drawings, the Subcontractor shall be responsible for proper location and clearances and for correcting discrepancies and interferences in the work which are a result of his operations. Work done by one trade that must be integrated with work of other trades shall be laid out with due regard to the work done, or to be done, by interfacing trades. The Subcontractor shall cooperate in coordinating his work with work being done by others. The Subcontractor shall notify the Contractor at least one week prior to the date on which the Subcontractor proposes to proceed with the work.

Painting: Paint those areas exposed outside with an alkyd primer conforming to Federal Specification TT-C-530 and a Semigloss Alkyd Enamel finish conforming to Federal Specification TT-E-529. Apply one coat of primer and two coats of finish paint. Paint shall be applied in such manner as to preclude runs, sagging, brush marks, holidays or other defects in the finished surface. All paint shall, otherwise, be applied in strict accordance with the paint manufacturer's directions.

As to an alternative to painting on outdoor structure elements, stainless steel may be substituted for carbon steel.

Workmanship: All work shall be done in a skillful and workmanlike manner. The Subcontractor shall do all structural cutting, fitting, patching, repairing and associated work necessary for installation of equipment, wiring and electrical conduits, etc. No major cuts or holes, not shown on the drawings, shall be made without prior approval of the project manager. After the equipment and/or conduit is installed, all exposed holes, cracks and other defects shall be neatly patched and the patched areas shall match the adjoining materials and finish.

Arrange work in a neat, well organized manner with conduit and similar services running parallel with the primary lines of the building construction, and with a minimum of 7 ft-0 in. overhead clearance where possible.

Locate operating and control equipment properly to provide easy access, and arrange entire instrumentation work with adequate access for operation and maintenance.

Advise other trades of openings or clearances required in their work for the subsequent move-in and assembly of large units of equipment.

Electrical connections shall be tightened to torque specifications stated by the equipment manufacturer.

Ensure instruments and electrical equipment are mounted per manufacturer's recommendations using the provided mounting holes, brackets and hardware.

Dimension Verification: The Subcontractor shall field verify dimensions prior to fabrication.

LABELING:

Equipment: Install the engraved labels as shown on the drawings. Identifying items with marking pens, adhesive tape, embossed plastic or metal tape, or similar type means is not acceptable.

Labels shall be laminated phenolic or plastic colored black with white engraved letters.

Unless shown otherwise on the drawings equipment mounted outside shall be labeled with a stainless steel tag of a thickness not less than 20 gauge with legend letters not less than ¼ inch tall.

If not shown on the drawings equipment nametags shall be installed by one of the following means:

1. Suspend from equipment with 1/16-inch stainless steel bead chain or cable.
2. If inside, attached to equipment or immediately next to equipment using a suitable adhesive such as General Electric RTV silicone rubber. They may also be attached to equipment or immediately next to equipment using bolts, screws or rivets.
3. If outside, attached to equipment or immediately next to equipment using bolts, screws, or rivets.

Wire: All conductors or cables shall be identified with white heat shrink tubing with black typed on minimum 3/32 inch letters with non-smear ink such as Brady-321, Brady-322 or

approved equal. Hand lettered labels shall not be used. All conductors or cables shall be labeled with point-to-point destination. Wire label legends shall follow an origin/destination practice. For example consider a single conductor between terminal 8 on TB9 in CP-YDJ-963 and terminal A on instrument FSL-YDJ-3. At CP-YDJ-963 the label would be 8/ FSL-YDJ-3-A and at FSL-YDJ-3 the label would be A/CP-YDJ-963-TB9-8. If legend length would exceed label length it is acceptable to drop the sub area (YDJ) from the legend.

Red Line Requirements: The Subcontractor shall maintain a set of red line drawings for the entire project that must be updated on a daily basis. The update must include wiring changes and major (greater than 2 feet in location or 6 inches in size) changes in equipment locations, sizes, and elevations. The red line drawings shall also show all changes to List of Material information.

The above update will be subject to monitoring on a daily basis by the Contractor's Representative. The Subcontractor may use the existing project drawings to perform the update. Upon completion of the project the Subcontractor must submit the as-built red line drawings as vendor data for approval.

QUALITY CONTROL TESTING:

Subcontractor Supplied Testing:

Electrical Continuity: After conductor connectors are installed and conductors are labeled, but prior to termination to terminals or devices, an electrical continuity test shall be performed on each conductor using a battery powered buzzer or ohmmeter to determine that all power, control, grounding and other conductors are properly installed and identified. The Subcontractor shall provide the Test Data Submittal Sheets. List all conductors tested on required test data submittal sheets.

Contractor Testing: Upon completing installation of all systems and equipment, but prior to project close out, the Subcontractor shall perform a component check-out test. The test shall be performed using a test procedure written by the Subcontractor and approved by the Contractor. A Contractor's representative will be present to assist in performing the test and will verify that all of the PLC points, the Subcontractor shall also conduct an operational test of all other equipment, controls and devices installed or modified. All equipment shall test satisfactorily or be repaired or replaced (except GFE) at no additional cost to the Contractor. The Subcontractor shall provide the Contractor at least ten (10) working days notice prior to performing the test.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 16810

SUBCONTRACT NO. S-_____
SCHEDULE "X"

1. The Government will furnish to the Subcontractor at no cost the equipment or material listed below. The equipment or material may be obtained by the Subcontractor at the time he is ready to make the installation in accordance with the provisions of the contract.
2. The items will be available only during normal working hours and a twenty-four (24) hour minimum advance notice (Saturdays, Sundays, and holidays excluded) to the Subcontracting Officer will be required.
3. Transportation costs shall be the responsibility of the Subcontractor.

Item No.	Description	Manufacturer No.	Qty.	Turnover Location	Reference	Approximate Cost	Date Available
Gloveboxes							
1	Glovebox Assembly No. 3		1	RWMC	Appendix "A"	$300,000 ea.	12/19/02
1	Glovebox Assembly No. 2		1	RWMC	Appendix "A"	$300,000 ea.	1/15/03
1	Glovebox Assembly No. 1		1	RWMC	Appendix "A"	$300,000 ea.	1/27/03
2	Drum-Loadout Enclosures (Tents)		3	RWMC	Drawing 522003	$25,000 ea.	1/13/02
Excavation System includes:							
3	Excavator, modified	Caterpillar Co. 446B	1	RWMC	Appendix "C"	$500,000	1/27/03
4	Excavator swing boom shims & screws and miscellaneous parts	BBWI	1	RWMC	Appendix "C"	$500	1/27/03
5	Excavator support stands	BBWI	14	RWMC	Appendix "C"	$32,000	1/27/03
6	PGS Inlet HEPA Filter Housings and Isolation Valves	Flanders/CSC	3	CFA	Spec. Section 15801	$10,000 ea.	12/2/02

Project Title: **Facility Package for the OU 7-10 Glovebox Excavator Method Project**

Document Type: **Technical Specifications** Project Number 021052
Revision Number: 0

Item No.	Description	Manufacturer No.	Qty.	Turnover Location	Reference	Approximate Cost	Date Available
H&V System (WES, RCS, & PGS):							
7	Personnel Access Room HEPA Filter Housing and Isolation Valve	Flanders/CSC	1	CFA	Spec. Section 15801	$10,000	12/2/02
8	RCS Inlet HEPA Filter Housing including DOP Test Sections and Isolation Valves	Flanders/CSC	1	CFA	Spec. Section 15801	$120,000	12/2/02
9	PGS Drumout Station Exhaust HEPA Filter Housing and Isolation Valves	Flanders/CSC	3	CFA	Spec. Section 15801	$10,000 ea.	12/2/02
10	RCS Exhaust HEPA Filter Housing Including Isolation Valves, Pre-Filters & Housings, Moisture Separators & Housings, Heater Sections, Test Sections, HEPA Sections, and Transitions	Flanders/CSC	1	CFA	Spec. Section 15801	$300,000	12/2/02
Electrical Power System:							
11	Standby generator	Caterpillar - Custom	1	CFA	Drawing E-3	$58,000	11/16/02
Miscellaneous Systems:							
12	Plant Air Compressor	Sullair Oil-Flooded Rotary Screw Air Compressor, Model LS-10 30, 30 HP, 480 VAC 3Φ, 60 Hz, 115 psig, 120 ACFM, Enclosure installed, Automati modulation INEEL Property Number 321842	1	CFA-696	Spec. Section 15202, Drawing P-101	$8,000	11/16/02

Project Title: **Facility Package for the OU 7-10 Glovebox Excavator Method Project**

Document Type: **Technical Specifications** Project Number 021052

Revision Number: 0

Item No.	Description	Manufacturer No.	Qty.	Turnover Location	Reference	Approximate Cost	Date Available
13	Breathing Air System		1	N/A	Spec. Section 15202, Drawing P-101	$30,000	11/16/02
Instrumentation and Control:							
14	Programmable Logic Controller parts and equipment	Allen-Bradley 1756-A10	1	RWMC	Drawing IN-12	$10,000	1/17/03
15	120Vac Power Supply for PLC rack	Allen-Bradley 1756-PA72	1	RWMC	Drawing IN-12	$600	1/2/03
Criticality Alarm System:							
16	CAS-300N: Criticality Alarm Detector Cluster Control Module Wall Mounting Bracket	Canbera	 1 1 3	WMF-671 (WES)	Drawing IN-20	$65,000	2/24/03
Exhaust Monitoring System:							
17	Stack Monitoring System: Emissions Monitoring Cabinet Sample Lines (3) Sample Probes (3) Heat Trace Installation and Startup Support	TBD, SPC-392	1 3 3 1 1	WMF-671 (WES)	Drawing IN-22	Total ($160,000) $140,000 $1,000 $6,000 $600 $300	2/17/03
18	Type A Probe Tap:	Existing	Req	RWMC	Drawing S-18	$250.00 each	12/15/02

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08/01/2001
Rev. 03

Vendor Data Schedule

Project Title OU7-10 GLOVEBOX EXCAVATOR METHOD PROJECT FACILITY PACKAGE **Project No.** 021052 - 23431

System Engineer/ Project Manager GUILLEN LOUIS E **Date:** 01-JUL-02 **Rev:** 0

Vendor Data Coordinator Address STURM BETH L, WCB-3WH502, MS: 3535

Vendor Data Codes

A. As-Built Drawings B. Assembly Drawings C. Attendance Record D. Blasting Plan E. Catalog Data F. Chem & Physical Analysis G. Concrete Mix Design H. Control System Diagram I. Design Calculations J. Installation Instructions	K. Manufacturers Data Report L. O&M Manual M. Parts List N. Piping Drawing O. Procedure/Instructions P. Pump Head Curves Q. Personnel Qualifications R. Red_line Drawings S. RSMI & Maintenance Log T. Sample(Color, Texture, etc.)	U. Shop Drawings V. Survey Records W. Test Procedure X. Special Processes Y. Operational/CC Testing Z. Test Reports AA. UL/FM Listing AB. Warranty/Guarantee AC. Weld Records AD. Wiring Diagrams	AE. MSDS AF. Hardware Schedule AG. Specification AH. Manufacturing/Inspection/Test Plan AI. Test Certification AJ. Recommended Spares AK. Special Tools List AL. Certificate of Conformance AM. Certificate of Disposal or Destruction AN. Design Verification	AO. Design Qualification Testing AP. Traceability Procedure AQ. Cleaning Procedure AR. Weld Procedure Qualificaiton AS. Welder Performance Personnel Qualifications AT. Non-Destructive Examination Personnel Certifications AU. Inspector Certifications AV. Limited Shelf Life/Operational Data AW. Special Packaging, Shipping, and Rigging Procedure AX. Certificate of Materials to ASME Code AY. Chemical Inventory AZ. Other

When to Submit

AC - As Completed AT - After Test BC - Before Contract Awarded	BFA - Before Final Acceptance BFR - Before Fabrication Release ROS - Removed Off-Site PDS - Prior to Delivery on site	PTP - Prior to Purchase PS - Prior to Shipment PT - Prior to Test	PTC - Prior to Construction Start PTI - Prior to Installation PTW - Prior to Welding	TS - Time of Shipment WP - With Proposal

Item No.	Clause/Article or Drawing/Specification Reference	Description	Vendor Data Code	Extra Copies Required	When to Submit	Approval Code
1	05060	Weld procedure specification and procedure qualification records.	AR. Weld Procedure Qualificaiton	0	PTW - Prior to Welding	2. Information Only
2	05060	Weld personnel qualifications	AS. Welder Performance Personnel Qualifications	0	PTW - Prior to Welding	Information Only
3	05060	Shop drawings of welds	U. Shop Drawings	0	PTW - Prior to Welding	1. Approval Required
4	05060	Weld histories.	AC. Weld Records	0	PTW - Prior to	1. Approval

					Welding	Required
5	05060	Filler metal CMTR's, chemical property, and heat number identification.	AC. Weld Records	0	PTW - Prior to Welding	1. Approval Required
6	05060	Procedures for the handling, storage, and control of filler and backing material	O. Procedure/Instructions	0	PTW - Prior to Welding	2. Information Only
7	05060	Weld repair procedure.	O. Procedure/Instructions	0	PTW - Prior to Welding	1. Approval Required
8	05060	Cleaning procedures for stainless steel.	O. Procedure/Instructions	0	PTW - Prior to Welding	2. Information Only
9	05060	Procedures for identification and control of tools and equipment used for stainless steel.	O. Procedure/Instructions	0	PTW - Prior to Welding	2. Information Only
10	05060	Weld repair report.	AC. Weld Records	0	BFA - Before Final Acceptance	2. Information Only
11	05100	Shop drawings	U. Shop Drawings	0	PTC - Prior to Construction Start	2. Information Only
12	05100	Erection drawings, details	B. Assembly Drawings	0	BFR - Before Fabrication Release	2. Information Only
13	05100	Certified copies of mill test reports	AI. Test Certification	0	BFR - Before Fabrication Release	2. Information Only
14	05100	Certificates of confomrance for fasteners	AL. Certificate of Conformance	0	BFR - Before Fabrication Release	2. Information Only
15	07901	Joint sealant product data.	E. Catalog Data	0	PTP - Prior to Purchase	2. Information Only
16	07901	VOC compound regulations certification.	AZ. Other	0	PTP - Prior to Purchase	2. Information Only
17	09900	Paint technical data	E. Catalog Data	0	PTC - Prior to Construction Start	2. Information Only
18	09900	Submit color sample	T. Sample(Color, Texture, etc.)	0	PTC - Prior to Construction Start	2. Information Only
19	09900	Paint MSDS.	AE. MSDS	0	PTP - Prior to Purchase	2. Information Only
20	13910	Water mistsystem layout package.	U. Shop Drawings	0	PTC - Prior to Construction Start	1. Approval Required
21	13910	Hydrostatic test certificate.	AI. Test Certification	0	AT - After Test	2. Information Only
22	13910	UL/FM listing and/or FM approval for water mist nozzles, piping, fitting and devices.	E. Catalog Data	0	PTC - Prior to Construction Start	2. Information Only
23	13910	Hydrostatic test procedure.	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
24	13910	Operational test.	AI. Test Certification	0	AT - After Test	2. Information

						Only
25	13910	Designer Certification.	Q. Personnel Qualifications	0	PTC - Prior to Construction Start	2. Information Only
26	13911	Letter from building mfg. on hanger connections. Includes Dry Pipe and Manual Deluge Systems.	K. Manufacturers Data Report	0	PTC - Prior to Construction Start	Information Only
27	13911	Designer certification for Dry Pipe and Manual Deluge systems.	Q. Personnel Qualifications	0	PTC - Prior to Construction Start	2. Information Only
28	13911	Hydrostatic test procedure for both Dry Pipe and Manual Deluge systems.	W. Test Procedure	0	PT - Prior to Test	Approval Required
29	13911	Operational test for Dry Pipe and Manual Deluge systems.	AI. Test Certification	0	AT - After Test	2. Information Only
30	13911	Fire suppression system layout package. Includes Dry Pipe and Manual Deluge systems.	U. Shop Drawings	0	PTC - Prior to Construction Start	1. Approval Required
31	13911	Catalog data for both Dry Pipe and Manual Deluge systems.	AA. UL/FM Listing	0	PTC - Prior to Construction Start	2. Information Only
32	13911	Hydrostatic test certification for both Dry Pipe and Manual Deluge systems.	AI. Test Certification	0	AT - After Test	2. Information Only
33	13916	Pump head curves.	P. Pump Head Curves	0	PTC - Prior to Construction Start	1. Approval Required
34	15014	Pre-weld package including certifications and qualifications and procedures, etc.	AC. Weld Records	0	PTW - Prior to Welding	2. Information Only
35	15014	Detailed weld repair procedures.	O. Procedure/Instructions	0	PTW - Prior to Welding	2. Information Only
36	15014	Post-weld package includes testing & inspection results, weld maps, histories and shop drawings, etc.	AC. Weld Records	0	BFA - Before Final Acceptance	2. Information Only
37	15016	Personnel qualification records.	AS. Welder Performance Personnel Qualifications	0	PTW - Prior to Welding	2. Information Only
38	15016	WPS & PQR.	O. Procedure/Instructions	0	PTW - Prior to Welding	2. Information Only
39	15202	Plant Air Storage Tank	K. Manufacturers Data Report	0	TS - Time of Shipment	Approval Required
40	15202	Compressed Air Piping	W. Test Procedure	0	PT - Prior to Test	Approval Required
41	15202	Breathing Air Storage Tank	K. Manufacturers Data Report	0	TS - Time of Shipment	2. Information Only
42	15202	Compressed Air Piping	Z. Test Reports	0	BC - Before Contract Awarded	2. Information Only
43	15409	Seismic Design Calcs	I. Design Calculations	0	PTP - Prior to Purchase	1. Approval Required
44	15409	In Service Leak Test Procedure-Water Piping	W. Test Procedure	0	PT - Prior to Test	2. Information

						Only
45	15409	In Service Leak Test Procedure- Air Piping	W. Test Procedure	0	PT - Prior to Test	2. Information Only
46	15409	Catalog Data for Dust Suppression System Assembly	E. Catalog Data	0	BFR - Before Fabrication Release	Information Only
47	15409	O&M Manual for Dust Suppression System Assembly	L. O&M Manual	0	AC - As Completed	2. Information Only
48	15409	System Operational Test Report	Z. Test Reports	0	AT - After Test	Information Only
49	15409	System Operational Test Procedure	W. Test Procedure	0	PT - Prior to Test	Information Only
50	15409	Special Packaging, Shipping, and Rigging Procedure	AW. Special Packaging, Shipping, and Rigging Procedure	0	PS - Prior to Shipment	Information Only
51	15409	Fog Nozzle Droplet Size Performance Data	K. Manufacturers Data Report	0	BFR - Before Fabrication Release	Information Only
52	15409	Red line drawings of control sequence and programming, changes created on site by vendor	R. Red_line Drawings	0	AC - As Completed	Information Only
53	15409	Warranties	AB. Warranty/Guarantee	0	BFA - Before Final Acceptance	2. Information Only
54	15409	Detailed Design Assembly Drawings	B. Assembly Drawings	0	BFR - Before Fabrication Release	1. Approval Required
55	15409	Recommended Spares for Dust Suppression Assembly	AJ. Recommended Spares	0	BFA - Before Final Acceptance	2. Information Only
56	15409	Startup Procedure for Dust Suppression System	O. Procedure/Instructions	0	TS - Time of Shipment	Information Only
57	15409	Dust Suppression System Assembly Installation Instructions	J. Installation Instructions	0	BFR - Before Fabrication Release	2. Information Only
58	15409	Control System Diagram for Dust Suppression System Assembly	H. Control System Diagram	0	PTI - Prior to Installation	1. Approval Required
59	15409	In Service Leak Test Report- Air Piping	Z. Test Reports	0	AT - After Test	2. Information Only
60	15409	In Service Leak Test Report- Water Piping	Z. Test Reports	0	AT - After Test	2. Information Only
61	15800	WES Inlet Air Filters Product Data	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
62	15800	Counterbalanced Backdraft Dampers Product Data	K. Manufacturers Data Report	0	BFA - Before Final Acceptance	2. Information Only
63	15800	WES Radiant Heaters Product Data	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
64	15800	Radiant Heaters Wiring Diagrams	AD. Wiring Diagrams	0	BFA - Before Final	2. Information

					Acceptance	Only
65	15800	WES Unit Heaters	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
66	15800	WES Unit Heaters	AD. Wiring Diagrams	0	BFA - Before Final Acceptance	2. Information Only
67	15800	Transfer Vestibule Supply Fan	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
68	15800	Transfer Vestibule Supply Fan	AD. Wiring Diagrams	0	BFA - Before Final Acceptance	2. Information Only
69	15800	Main Exhaust Fan	K. Manufacturers Data Report	0	BFA - Before Final Acceptance	2. Information Only
70	15800	Main Exhaust Fan	AD. Wiring Diagrams	0	BFA - Before Final Acceptance	2. Information Only
71	15800	Back-Up Exhaust Fan	K. Manufacturers Data Report	0	BFA - Before Final Acceptance	2. Information Only
72	15800	Back-Up Exhaust Fan	AD. Wiring Diagrams	0	BFA - Before Final Acceptance	2. Information Only
73	15800	Fan Isolation Dampers	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
74	15800	Extra Materials Shelf Life	AV. Limited Shelf Life/Operational Data	0	BFA - Before Final Acceptance	2. Information Only
75	15800	Flow Element	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
76	15800	CS Ductwork	A. As-Built Drawings	0	BFA - Before Final Acceptance	2. Information Only
77	15800	System Construction Component Testing	W. Test Procedure	0	PT - Prior to Test	2. Information Only
78	15800	System Construction Component Testing	Z. Test Reports	0	AT - After Test	2. Information Only
79	15801	Pressure Relief Damper	E. Catalog Data	0	BFA - Before Final Acceptance	2. Information Only
80	15801	Pressure Relief Damper	AD. Wiring Diagrams	0	BFA - Before Final Acceptance	2. Information Only
81	15801	System Construction Component Testing	W. Test Procedure	0	PT - Prior to Test	2. Information Only
82	15801	System Construction Component Testing	Z. Test Reports	0	AT - After Test	2. Information Only
83	15801	Pressure Relief Damper	AJ. Recommended Spares	0	BFA - Before Final Acceptance	2. Information Only
84	15801	Pressure Relief Damper	L. O&M Manual	0	BFA - Before Final	2. Information

					Acceptance	Only
85	15980	TAB Personnel Qualifications	Q. Personnel Qualifications	0	PT - Prior to Test	2. Information Only
86	15980	TAB Test Procedures	W. Test Procedure	0	PT - Prior to Test	2. Information Only
87	15980	TAB Test Reports	Z. Test Reports	0	AT - After Test	2. Information Only
88	15980	TAB Performance Guarantee	AB. Warranty/Guarantee	0	AT - After Test	2. Information Only
89	15980	TAB Instrumentation Calibration Reports	Z. Test Reports	0	PT - Prior to Test	2. Information Only
90	16109	Receptacle Test Procedure	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
91	16109	receptacle Test Report	Z. Test Reports	0	AT - After Test	2. Information Only
92	16110	Cable Tray System	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
93	16120	Cable Test Procedure	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
94	16120	Cable Test Report	Z. Test Reports	0	AT - After Test	2. Information Only
95	16155	O&M Manual	L. O&M Manual	0	AC - As Completed	2. Information Only
96	16155	Test Report	Z. Test Reports	0	AT - After Test	2. Information Only
97	16155	Catalog Data	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
98	16160	Panelboard Data	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
99	16160	Panel Schedules	AZ. Other	0	AC - As Completed	2. Information Only
100	16360	Catalog Data	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
101	16450	Ground Resistance Test Procedure	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
102	16450	Ground Resistance Test Report	Z. Test Reports	0	AT - After Test	2. Information Only
103	16460	Catalog Data	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
104	16460	Product Certification	AZ. Other	0	BFA - Before Final	2. Information

					Acceptance	Only
105	16500	Catalog Data for each Fixture	E. Catalog Data	0	PTP - Prior to Purchase	1. Approval Required
106	16500	Warranties	AB. Warranty/Guarantee	0	BFA - Before Final Acceptance	1. Approval Required
107	16500	Lighting Contactor Wiring Diagram	AD. Wiring Diagrams	0	AC - As Completed	2. Information Only
108	16500	Test Reports	Z. Test Reports	0	AT - After Test	2. Information Only
109	16630	CCTVS Block Diagram	H. Control System Diagram	0	BC - Before Contract Awarded	1. Approval Required
110	16630	CCTVS-Red-Line Drawings	R. Red_line Drawings	0	BFA - Before Final Acceptance	1. Approval Required
111	16630	CCTVS-Video Cable assemblies	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
112	16630	CCTVS-Excavator Monitor and Stand	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
113	16630	CCTVS-Excavator Control Panel (VM_CP_12)	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
114	16630	CCTVS - Remote Function Control Matrix	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
115	16630	CCTVS - Glove Box camera control unit	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
116	16630	CCTVS - RCS Camera Control Units	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
117	16630	CCTVS Test Report	Z. Test Reports	0	AT - After Test	1. Approval Required
118	16630	CCTVS Operating and Maintenance Manuals	L. O&M Manual	0	TS - Time of Shipment	2. Information Only
119	16630	CCTVS Video Equipment Racks - Layout Drawings	U. Shop Drawings	0	BFR - Before Fabrication Release	1. Approval Required
120	16630	CCTVS Pan and Tilt Actuators	AG. Specification	0	BFA - Before Final Acceptance	1. Approval Required
121	16630	CCTVS video camera specifications	AG. Specification	0	BFA - Before Final Acceptance	1. Approval Required
122	16630	CCTVS Test Procedure	AH. Manufacturing/Inspection/Test Plan	0	PT - Prior to Test	1. Approval Required
123	16630	Video Monitors and Video Tape Recorders	E. Catalog Data	0	BFR - Before Fabrication Release	2. Information Only
124	16631	Functional test	W. Test Procedure	0	PT - Prior to Test	1. Approval

						Required
125	16631	Velocity Profile Test Report	Z. Test Reports	0	AT - After Test	Approval Required
126	16631	Velocity profile test	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
127	16632	Functional Test Procedure	W. Test Procedure	0	PT - Prior to Test	1. Approval Required
128	16632	Functional Test Report	Z. Test Reports	0	AT - After Test	1. Approval Required
129	16721	Fire Alarm System	A. As-Built Drawings	0	BFA - Before Final Acceptance	Approval Required
130	16721	Fire Alarm System	E. Catalog Data	0	BFR - Before Fabrication Release	Information Only
131	16721	Fire Alarm System	H. Control System Diagram	0	BFR - Before Fabrication Release	Approval Required
132	16721	Fire Alarm System	I. Design Calculations	0	BFR - Before Fabrication Release	Approval Required
133	16721	Fire Alarm System	L. O&M Manual	0	BFA - Before Final Acceptance	Information Only
134	16721	Fire Alarm System	Q. Personnel Qualifications	0	BFR - Before Fabrication Release	Information Only
135	16721	Fire Alarm System	U. Shop Drawings	0	BFR - Before Fabrication Release	Approval Required
136	16721	Fire Alarm System	W. Test Procedure	0	PT - Prior to Test	Approval Required
137	16721	Fire Alarm System	Z. Test Reports	0	BFA - Before Final Acceptance	Information Only
138	16730	Carbon Monoxide (CO) Detection System	E. Catalog Data	0	BFR - Before Fabrication Release	Information Only
139	16730	Carbon Monoxide (CO) Detection System	H. Control System Diagram	0	BFR - Before Fabrication Release	Approval Required
140	16730	Carbon Monoxide (CO) Detection System	J. Installation Instructions	0	BFR - Before Fabrication Release	Information Only
141	16730	Carbon Monoxide (CO) Detection System	L. O&M Manual	0	PT - Prior to Test	Information Only
142	16730	Carbon Monoxide (CO) Detection System	M. Parts List	0	BFR - Before Fabrication Release	Information Only
143	16730	Carbon Monoxide (CO) Detection System	AD. Wiring Diagrams	0	BFR - Before Fabrication Release	Approval Required
144	16730	Carbon Monoxide (CO) Detection System	AJ. Recommended Spares	0	BFA - Before Final	Information

					Acceptance	Only
145	16810	Pit 9 IN Drawings	A. As-Built Drawings	0	AC - As Completed	2. Information Only
146	16810	Component checkout test.	Z. Test Reports	0	AT - After Test	2. Information Only
147	16810	PowerFlex 70 Manual	L. O&M Manual	0	AC - As Completed	2. Information Only
148	16810	Yokogawa Pressure Transmitter Manual	L. O&M Manual	0	AC - As Completed	2. Information Only
149	16810	Omega Temperature Transmitter Manual	L. O&M Manual	0	AC - As Completed	2. Information Only
150	16810	Red Lion Display Manual	L. O&M Manual	0	AC - As Completed	2. Information Only
151	16810	Electrical Continuity Test	W. Test Procedure	0	PTI - Prior to Installation	2. Information Only
152	Appendix A	Glovebox Bubble test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
153	Appendix A	Light beam opeation and interlocks test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
154	Appendix A	Glovebox/cart support structure alignment results	Z. Test Reports	0	BFA - Before Final Acceptance	2. Information Only
155	Appendix A	Cart operation test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
156	Appendix A	Hoist opeation test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
157	Appendix B	Lift table opeation test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
158	Appendix B	Toe board opeation safety stop test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
159	Appendix B	Turntable opeation test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
160	Appendix C	Catch basin leak test	Z. Test Reports	0	BFA - Before Final Acceptance	2. Information Only
161	Appendix C	Outer boot bubble test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
162	Appendix C	Excavator anchorage bolt torque results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
163	Appendix C	Written verification that bolt holes intersect I-beams	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
164	Appendix C	Weld PT inspection report	Z. Test Reports	0	BFA - Before Final	1. Approval

					Acceptance	Required
165	Appendix D	Tent enclosure smoke test results	Z. Test Reports	0	BFA - Before Final Acceptance	1. Approval Required
166	Drawing A-9	Personnel Lockers	E. Catalog Data	0	PTI - Prior to Installation	2. Information Only
167	Drawing A-9	Sample Refrigerator	E. Catalog Data	0	PTI - Prior to Installation	2. Information Only

Instructions:

1. Refer to subcontract documents for instructions on submittals.
2. Electronic submittals in lieu of paper documents are acceptable and encouraged.
3. The normal number of copies required is ONE. If more are required, the number will be shown here.
4. THE INEEL WILL SCAN ALL SUBMITTED VENDOR DATA INTO A SYSTEM THAT IS ACCESSIBLE TO ALL INEEL EMPLOYEES UNLESS THE SUPPLIER/SUBCONTRACTOR IDENTIFIES SUBMITTED INFORMATION AS PROPRIETARY.